APPENDIX I

Input: a set of categorical variables $X2$ of dimension $M \times N$
Output: an expanded dummies DX
Process:

    Set DX as an empty matrix
    For each of the categorical variable $x2$ in $X2$
        Calculate k -- the number of its categories
        Initialize a matrix TX of size $M \times k$ with 0;
        For i = 1 to M,
            $x = x2$(i)
            q is the index for x; ($1 <= q <= k$)
            $TX(i, q) = 1$
        End For
        Find the column that has least 1s, say it is column d; ($1 <= d <= k$);
        Delete column d from TX;
        Concatenate TX to DX vertically; // $DX = [DX\ TX]$;
        Record category index and drop category name
    End For